

What Is Claimed Is:

- 1 1. An ESD protection circuit, located on a substrate of a first
2 conductivity type, comprising:
3 a lateral silicon controlled rectifier (SCR), comprising:
4 a P-type layer, as an anode of the SCR;
5 an N-type layer, as a cathode of the SCR;
6 a first N-well, located between the P-type layer and the
7 N-type layer, contacted with the P-type layer; and
8 a first P-well, contacted to the first N-well and the
9 N-type layer; and
10 a deep well of a second conductivity type, located between
11 the lateral SCR and the substrate, for isolating the
12 electric connection between the substrate and the lateral
13 SCR.
- 1 2. The ESD protection component as claimed in claim 1, wherein
2 the N-type layer is formed by a first N-type diffusion in the
3 first P-well.
- 1 3. The ESD protection component as claimed in claim 1, wherein
2 the first P-well is coupled to the cathode.
- 1 4. The ESD protection component as claimed in claim 1, wherein
2 the lateral SCR is an N-type SCR (N-type silicon rectifier,
3 NSCR).
- 1 5. The ESD protection component as claimed in claim 1, wherein
2 the lateral SCR is a P-type SCR (P-type silicon rectifier,
3 PSCR).

- 1 6. The ESD protection component as claimed in claim 1, wherein
2 the P-type layer is located in the first N-well.
- 1 7. The ESD protection circuit as claimed in claim 1, wherein the
2 substrate is an N-substrate and the deep well is a deep P-
3 well.
- 1 8. The ESD protection component as claimed in claim 1, wherein
2 the substrate is a P-substrate and the deep well is a deep
3 N-well.
- 1 9. The ESD protection component as claimed in claim 8, wherein
2 the deep N-well is connected to a fix-biased N-well and coupled
3 to a relatively high voltage power source.
- 1 10. The ESD protection component as claimed in claim 9, wherein
2 the fixed-biased N-well, the deep N-well and the first N-well
3 electrically isolate the first P-well and the P-substrate.
- 1 11. The ESD protection component as claimed in claim 9, wherein
2 the fixed-biased N-well, the deep N-well and the first N-well
3 electrically isolate the P-type layer and the P-substrate.
- 1 12. The ESD protection component as claimed in claim 9, wherein
2 the fixed-biased N-well encloses the lateral SCR.
- 1 13. The ESD protection component as claimed in claim 8, wherein
2 the N-type layer comprises a second N-well, the deep N-well
3 comprises a separated first deep N-well and second deep N-

well, respectively abutting the first N-well and the second N-well.

14. An ESD protection circuit, coupled between a first connection pad and a second connection pad, comprising:
an ESD protection component, having an anode and a cathode, located on a substrate of a first conductivity type, comprising:
a lateral SCR, comprising:
a P-type layer, as the anode of the SCR;
a N-type layer, as the cathode of the SCR;
a first N-well, located between the P-type layer and the N-type layer, contacted with the P-type layer; and
a first P-well, contacted to the first N-well and the N-type layer; and
a deep well of a second conductivity type, located between the lateral SCR and the substrate, for isolating the electric connection between the lateral SCR and the substrate;
wherein the anode and the cathode are coupled to the first connection pad and the second connection pad, respectively.

15. The ESD protection circuit as claimed in claim 14, wherein the substrate is a P-substrate coupled to a relatively low power rail, and the deep well is a deep N-well coupled to a relatively high power rail.

16. The ESD protection circuit as claimed in claim 14, wherein the substrate is a N-substrate coupled to a relatively high

3 power rail, and the deep well is a deep P-well coupled to a
4 relatively low power rail.

1 17. The ESD protection circuit as claimed in claim 14, wherein
2 the ESD protection circuit further comprises a diode, coupled
3 between the first connection pad and the second connection pad,
4 and forward stacked with the lateral SCR.

1 18. The ESD protection circuit as claimed in claim 14, wherein
2 the lateral SCR is an NSCR, and the ESD protection circuit
3 further comprises an ESD-detection circuit providing a trigger
4 voltage to a control gate of the NSCR at the occurrence of the
5 ESD event to trigger on the NSCR.

1 19. The ESD protection circuit as claimed in claim 18, wherein
2 the ESD-detection circuit comprises a RC circuit, for
3 detecting an ESD event.

1 20. The ESD protection circuit as claimed in claim 14, wherein
2 the lateral SCR is a PSCR, and the ESD protection circuit
3 further comprises an ESD-detection circuit providing a trigger
4 voltage to a control gate of the PSCR at the occurrence of the
5 ESD event to trigger on the PSCR.

1 21. The ESD protection circuit as claimed in claim 20, wherein
2 the ESD-detection circuit comprises a RC circuit, for
3 detecting an ESD event.

1 22. The ESD protection circuit as claimed in claim 14, wherein
2 the first connection pad is used as an input of a relatively

3 high-voltage power source, and the second connection pad is
4 used as an input of the relatively low-voltage power source.

1 23. The ESD protection circuit as claimed in claim 14, wherein
2 the first connection pad is used as a high voltage power pad,
3 and the second connection pad is used as an I/O pad.

1 24. The ESD protection circuit as claimed in claim 14, wherein
2 the first connection pad is used as an I/O pad, and the second
3 connection pad is used as a low voltage power pad.

1 25. The ESD protection circuit as claimed in claim 14, wherein
2 the first connection pad is a high voltage power pad, and the
3 second connection pad is a low voltage power pad.

1 26. The ESD protection circuit as claimed in claim 14, wherein
2 the ESD protection circuit further comprises an inverted ESD
3 protection component, having an anode coupled to the second
4 connection pad and a cathode coupled to the first connection
5 pad.

1 27. The ESD protection circuit as claimed in claim 14, wherein
2 the ESD protection circuit comprises a plurality of ESD
3 protection components, forwardly stacked between the first
4 connection pad and the second connection pad for preventing
5 from latch-up problem.